IN THE TITLE

Please amend the title as set forth below:

~~OPTICAL HEAD FOR SCANNING A RECORD CARRIER~~ COMPENSATING FOR SPHERICAL ABERRATION INDUCED WHEN READING FROM OPTICAL RECORD CARRIERS WITH TRANSPARENT LAYERS OF DIFFERENT THICKNESSES

IN THE SPECIFICATION

Please amend the paragraph within the specification beginning on page 4, line 32 with the following:

If the wavefront deviation induced by the phase structure in the second radiation beam is properly chosen, the outer sub-beam will form a radiation distribution that does not overlap the central distribution. This so-called outer intensity distribution is separated from the central intensity distribution by a substantially dark area. The separation between the two distributions allows spatial filtering of the rays in the second radiation beam, which is ~~realised~~ realized by arranging the photo-sensitive area of the detection system such that it captures mainly rays of the central intensity distribution. The record carrier will then be scanned with the desired numerical aperture. Hence, the outer intensity distribution can effectively be kept away from the detection system using a relatively inexpensive optical element having a non-periodic phase structure.

Please amend the paragraph within the specification beginning on page 6, line 15 with the following:

The effect of the phase structure on the first radiation beam is ~~minimised~~ minimized, i.e. the phase structure introduces a globally flat wavefront deviation, if, preferably, the difference between the optical paths of ~~neighbouring~~ neighboring areas of the phase structure are substantially equal to an integer times the first wavelength.

Please amend the paragraph within the specification beginning on page 7, line 17 with the following:

Figure 1 shows a device 1 for scanning a first optical record carrier 2 of a first type and a second record carrier 40 of the second type. In the embodiment shown in the first type is the digital versatile disc (DVD) and the second type is the writable Compact Disc (CD). The record carrier 2 comprises a transparent layer 3, on one side of which an information layer 4 is arranged. The side of the information layer facing away from the transparent layer is protected from environmental influences by a protection layer 5. The side of the transparent layer facing the device is called the entrance face 6. The transparent layer 3 acts as a substrate for the record carrier by providing mechanical support for the information layer. Alternatively, the transparent layer may have the sole function of protecting the information layer, while the mechanical support for the information layer is provided by a layer on the other side of the information layer, for instance by the protection layer 5 or by a further information layer and a transparent layer connected to the information layer 4. Information may be stored in the information layer 4 of the record carrier in the form of optically detectable marks arranged in substantially parallel, concentric or spiral tracks, not indicated in the Figure. The marks may be in any optically readable form, e.g. in the form of pits, or areas with a reflection coefficient or a direction of ~~magnetisation~~ magnetization different from their surroundings, or a combination of these forms.

Please amend the paragraph within the specification beginning on page 13, line 4 with the following:

where n is the refractive index of the transparent layer 41. The wavefront aberrations in equations (5) and (6) are expressed in terms of Seidel polynomials. The spherical aberration term proportional to $W_{disc}(\rho)$ of the wavefront aberration is compensated by the phase structure for $NA<NA_2$, while furthermore a focus offset of $\Delta z$ is generated by the phase structure. The position of the best focus for the outer sub-beam can be found from ~~minimisation~~ minimization of the optical path difference (OPD) of the outer sub-

beam as a function of the defocus position $\Delta z_b$

Please amend the paragraph within the specification beginning on page 14, line 24 with the following:

In this embodiment, the objective system 10 has a single lens for focusing an incoming parallel beam with wavelength $\lambda_1$=660 nm into a converging beam with NA=0.6, which forms through the transparent layer 3 a spot on the information layer. The free working distance in this embodiment is 1.290mm. The thickness of the transparent layer is 0.6 mm and it is made of polycarbonate with a refractive index n=1.5803. The lens has a thickness on the optical axis of 1.922 mm and an entrance pupil diameter of 3.3 mm. The body of the lens is made of SFL56 Schott glass with refractive index n=1.7767. The convex surface of the lens body that is directed towards the collimator lens has a radius 2.32 mm. The lens has an aspherical shape in order to compensate for the spherical aberration incurred by the first radiation beam in the first transparent layer 3. The aspherical shape is ~~realised~~ realized by means of a thin layer of acryl on top of the glass body. The lacquer has refractive index n=1.5646. The thickness of this layer on the optical axis is 22 micrometer. The rotationally symmetric aspherical shape is given by the equation:

$$z(r) = B_{2i} r^{2I} \quad (11)$$

with z being the position of the surface along the optical axis in the direction of from the radiation source to the record carrier measured in millimeters, r the distance to the optical axis in millimeters, and $B_k$ the coefficient of the $k^{th}$ power of r. The value of the coefficients $B_2$ to $B_{14}$ are in this example 0.24134835, 0.0051012159, -0.00098850422, 0.00060334583, -0.00021740397, 1.9331367 $10^{-5}$ and 1.6587855 $10^{-6}$, respectively.